IN THE CLAIMS

The following listing of the claims is provided in accordance with 37 C.F.R. §1.121.

1. (currently amended) A method for calibrating coil sensitivity profiles comprising:

generating reference sensitivity maps for a plurality of coils ~~each coil~~;

imaging a subject;

interleaving, with said imaging of the subject, imaging of at least one fiducial mark provided with each coil; and

deriving, based on the coil positioning and coil loading, actual sensitivity maps from the reference sensitivity maps.

2. (original) A method in accordance with Claim 1 further comprising:

obtaining coil positioning and coil loading from said interleaving, with said imaging of the subject, imaging of at least one fiducial mark provided with each coil.

3. (original) A method in accordance with Claim 1 wherein said generating reference sensitivity maps for each coil comprises producing reference sensitivity maps for one time by imaging a phantom using a magnetic resonance imaging system.

4. (original) A method in accordance with Claim 1 wherein said generating reference sensitivity maps for each coil comprises producing the reference sensitivity maps for one time by solving Maxwell's equations.

5. (original) A method in accordance with Claim 1 wherein said interleaving, with said imaging of the subject, imaging of at least one fiducial mark provided with each coil comprises intermittently obtaining 1-dimensional projection images

of the at least one fiducial mark provided with each coil while performing said imaging of the subject.

6. (original) A method in accordance with Claim 1 further comprising embedding at least one fiducial mark within each coil before said interleaving, with said imaging of the subject, imaging of at least one fiducial mark provided with each coil.

7. (original) A method in accordance with Claim 1 further comprising placing the at least one fiducial mark on each coil, wherein a number of the at least one fiducial mark depends on whether each coil is attached to a solid former.

8. (original) A method in accordance with Claim 1 further comprising spatially registering the reference sensitivity maps based on changes in position of each coil determined from said interleaving, with said imaging of the subject, imaging of at least one fiducial mark provided with each coil.

9. (original) A method in accordance with Claim 1 further comprising scaling the reference sensitivity maps based on changes in the coil loading determined from said interleaving, with said imaging of the subject, imaging of at least one fiducial mark provided with each coil.

10. (original) A method in accordance with Claim 1 further comprising applying a magnetic field gradient substantially orthogonal to a surface of each coil to perform said interleaving, with said imaging of the subject, imaging of at least one fiducial mark provided with each coil.

11. (original) A method in accordance with Claim 1 further comprising performing one of:

imaging a phantom to generate the reference sensitivity maps; and

applying Biot-Savart's law to generate the reference sensitivity maps; and

solving Maxwell's equations to generate the reference sensitivity maps.

12. (currently amended) A magnetic resonance imaging system comprising:

a coil array configured to receive a plurality of signals to generate magnetic resonance images, wherein said coil array is configured to obtain partial gradient phase encoding signals from a subject and to receive signals from a fiducial mark provided with each coil in an interleaved manner~~, said coil array is configured to intermittently receive signals from at least one fiducial mark provided with each coil of said coil array, and said coil array is configured to intermittently receive signals while obtaining the partial gradient phase encoding signals~~; and

an image reconstructor configured to update sensitivity maps by using the ~~intermittently received~~ signals received from the subject and the fiducial mark and reference sensitivity maps, wherein said image reconstructor is further configured to construct magnetic resonance images based on the updated sensitivity maps and the partial gradient phase encoding signals.

13. (original) A magnetic resonance imaging system in accordance with Claim 12 further comprising a controller configured to perform one of solving Maxwell's equation and applying Biot-Savart's law to generate the reference sensitivity maps.

14. (currently amended) A magnetic resonance imaging system in accordance with Claim 12, wherein ~~the plurality of signals used to generate~~ the reference sensitivity maps are generated using ~~are signals from~~ a phantom.

15. (original) A magnetic resonance imaging system in accordance with Claim 12 further comprising:

a magnetic field control;

a gradient field control;

a transmitter;

at least one receiver; and

a controller operationally coupled to said magnetic field control, said gradient field control, said transmitter, and said receiver, wherein said controller is configured to instruct at least one of said magnetic field control, said gradient field control, said transmitter, and said receiver to apply a pulse sequence to generate for one time the reference sensitivity maps.

16. (currently amended) A magnetic resonance imaging system in accordance with Claim 12, wherein the image reconstructor generates the reference sensitivity maps ~~are generated~~ before obtaining the partial gradient phase encoding signals and before intermittently receiving signals reflected from the at least one fiducial mark provided with each coil of said coil array.

17. (original) A magnetic resonance imaging system in accordance with Claim 12 wherein said image reconstructor reconstructs a 1-dimensional projection image of the at least one fiducial mark from the intermittently received signals.

18. (currently amended) A magnetic resonance imaging system in accordance with Claim 12 wherein one or two fiducial marks are used when each coil is attached to a solid former ~~a number of the at least one fiducial mark provided with each coil of said coil array depends on whether each coil of said coil array is attached to a solid former~~.

19. (original) A magnetic resonance imaging system in accordance with Claim 12 further comprising a controller configured to spatially register the reference sensitivity maps based on changes in position of each coil determined from the at least one image reconstructed from the intermittently received signals.

20. (original) A magnetic resonance imaging system in accordance with Claim 12 further comprising a controller configured to scale the reference sensitivity maps based on changes in loading of each coil determined from at least one image reconstructed from the intermittently received signals.

21. (original) A magnetic resonance imaging system in accordance with Claim 12 further comprising a controller configured to instruct a gradient field control to energize a gradient coil, wherein said gradient coil is energized to generate a magnetic field gradient substantially perpendicular to a surface of a coil of said coil array.

22. (currently amended) A magnetic resonance imaging system comprising:

a coil array configured to receive a plurality of signals; and

a controller configured to generate sensitivity maps from the plurality of signals, wherein said coil array is further configured to collect partial gradient phase encoding signals from a subject, said coil array is configured to ~~intermittently~~ receive signals from at least one fiducial mark provided with each coil ~~of said coil array, and said coil array is configured to intermittently receive while obtaining~~ and the partial gradient phase encoding signals from the subject in an interleaved manner.

23. (original) A magnetic resonance imaging system in accordance with Claim 22 further comprising an image reconstructor configured to update sensitivity profiles from the intermittently received signals.

24. (currently amended) A magnetic resonance imaging system in accordance with Claim 23 [[22]] wherein the image reconstructor generates the sensitivity profiles ~~are generated~~ from reference sensitivity maps that are obtained before collecting the partial gradient phase encoding signals and before intermittently receiving signals from the at least one fiducial mark provided with each coil of said coil array.